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II-b
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JOB PROGRESS REPORT

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State: Montana Title: Western Montana Fisheries Investigation
Project No.: F-12-R-33 Title: Georgetown Lake Management Survey
Job No.: II-b
Period Covered: July 1, 1986-June 30, 1987

JOB OBJECTIVE AND DEGREE OF COMPLETION

1. To monitor the performance of two new rainbow strains in Georgetown Lake as well as the Arlee strain and the kokanee salmon.

The most consistent long term data for the fishery at Georgetown is that taken during the winter ice fishery. Twenty or more years of data are available for comparison with current conditions. The intensity of winter angling makes it feasible to collect information from large numbers of fish taken by anglers and alleviates the need to increase mortality by netting. Ice fishery data may also be collected in a most cost effective manner.

Kokanee salmon provide a majority of the winter catch and are avidly sought by many anglers. Salmon size in recent years has been declining despite efforts to reduce numbers by reduction in spawning runs in Stuart Mill Creek and the elimination of catch limits. Table 1. shows winter average sizes of kokanee for most years since 1966-67.

Table 1. Georgetown Lake Kokanee Lengths in Winter Angler Creel

Year	66-67	67-68	68-69	69-70	70-71	71-72	72-73	73-74
Sample Number	34	55	No	20	149	717	302	No
Average Length	12.3	10.7	data	11.4	10.9	10.6	9.9	data
Year	74-75	75-76	76-77	77-78	78-79	79-80	80-81	81-82
Sample Number	No	14	346	194	119	7	127	No.
Average Length	data	11.5	10.8	9.2	7.9	8.2	8.4	data
Year	82-83	83-84	84-85	85-86	86-87			
Sample Number	No	46	96	133	187			
Average Length	data	7.8	8.2	9.1	8.6			

Average size of kokanee declined from 1985-86 to 1986-87 winter catch although the 1986-87 average was larger than those in 1978-79 through 1984-85. Unquantified observation of kokanee catch per angler suggested that success had declined from the 1985-86 season. Figures 1-4 present angler caught kokanee lengths during winter 1984, 1985, 1986, 1987. The 1987 length frequency shows a clear bimodal distribution in contrast to a single peak in 1985 and 1986. The winter catch is composed of age classes which

will spawn in the year of data collection and in the following year. The younger age class in 1984 and 1985 comprised about 15% of the winter catch. In 1987 the younger age group made up about 33% of the harvest. The 1983-84 data set showed a bimodal distribution similar to 1986-87 and, although the sample size was small, the younger age group made up about 42% of the catch. Based on the 1983-84 through 1985-86 data, the 1987-88 kokanee fishery is expected to return to a larger average size, increased catch rate and greater total harvest.

Rainbow trout are the major trout species entering the harvest although naturally sustaining brook trout are also an important component of the catch. In the years immediately preceding 1984 the hatchery rainbow introductions were made up of the Arlee strain. In response to a long term decline in average size of creeled rainbow (Table 2.), a management change was implemented in 1984. Trout limits were previously ten trout or ten pounds and one fish. A brook trout limit of ten pounds, not to exceed twenty fish was also in effect. These were combined and reduced to five trout of all species. The reduction was intended to reduce harvest and allow for longer growth of stocked rainbows. Rainbow plants were scheduled to remain at the 250,000 annual level but were to be composed of 1/3 Arlee, 1/3 Eagle Lake and 1/3 Kamloops. The two new strains were included since both were reputed to be piscivorous in larger sizes and might be expected to utilize the large available forage base of redbside shiners and juvenile kokanee. Both Eagle Lake and Kamloops were said to have longer life spans than the relatively short lived Arlee and to be somewhat less vulnerable to angling mortality.

Average lengths of winter harvested rainbow trout for most years between 1966-67 and 1986-87 are shown in Table 2. Rainbow average length was 1.7 inches greater in 1985-86 than 1984-85. Average length in 1986-87 was 1.3 inches more than 1985-86 and 3 inches longer than 1984-85. These increases appear to represent longer growth periods before harvest and selective retention of larger trout by anglers.

Comparisons of rainbow strain performances are presented in Tables 3 and 4. Arlee and Eagle Lake performance in 1986-87 was similar to 1985-86. Arlee again represented a disproportionately large fraction of the catch (51% of stocked rainbow and 71% of catch in 1985-86; 47% of stocking and 70% of catch in 1986-87). This is probably due to the earlier stocking date for Arlee, June, as compared to July and August for Eagle Lake and Kamloops. Catchability of Arlee may also contribute to their higher than expected presence in the creel. Arlee lengths averaged slightly smaller than Eagle Lake lengths which probably results from smaller Arlee entering the fishery due to earlier stocking and hence greater growth opportunity before the winter harvest. Arlee lengths averaged 11.6 inches in 1985-86 and 12.6 inches in 1986-87 (Tables 3 & 4) presumably the result of reduced angler mortality resulting from reduced creel limits. Length frequencies of Arlee rainbow are shown in Figures 5 and 6.

Eagle Lake contribution to the creel was about equal to stocking percentage in both 1985-86 and 1986-87. Average length of creeled Eagle Lake increased from 11.2 inches in 1985-86 to 13.6 inches in 1986-87

(Tables 3 & 4). This appears to be due to the increasing average age as the 1984 stocked fish enter their third growing season. Maximum size increased from 12.9 to 16.4 inches representing growth of 1984 stocked fish.

Kamloops presence in the winter harvest was at a very low level in 1986-87 as it was in 1985-86 (Tables 3 and 4). This low return to the creel presumably results from the stocking of small size Kamloops late in the growing season and poor resulting survival. Lower catchability of Kamloops as compared to Arlee and Eagle Lake may also be a factor. Limited summer data still being collected at this time suggests that Kamloops may be entering the summer 1987 fishery in greater numbers and percentages of the harvest. A shift to spring stocking of overwintered hatchery Kamloops of 8 to 10 inches may be attempted to increase their survival.

Table 2. Georgetown Lake Rainbow Lengths in Winter Angler Creel

Year	66-67	67-68	68-69	69-70	70-71	71-72	72-73	73-74
Sample Number	214	306	No	247	555	1407	888	No
Average Length	11.7	11.3	data	11.1	10.1	10.6	10.7	data
Year	74-75	75-76	76-77	77-78	78-79	79-80	80-81	81-82
Sample Number	No	45	247	171	165	30	124	No
Average Length	data	10.4	10.6	10.0	9.9	11.2	9.7	data
Year	82-83	83-84	84-85	85-86	86-87			
Sample Number	No	3	42	296	242			
Average Length	data	9.7	9.8	11.5	12.8			

Table 3. Georgetown Lake rainbow strain evaluation winter 1985-86.

Strain	Stocking date	Size	Number	%	Sample No.	% Catch	Mean length	Range
Arlee	6-84/85	5"	157273	53	210	71	11.6"	8.4"-15.7"
Eagle Lake	9-84	5"	100556	34	84	28	11.2"	6.0"-12.9"
Kamloops	8-84	3"	38115	13	2	1	11.4"	9.8"-12.9"
Total			295944	100	296	100	11.5"	6.0"-15.7"

Table 4. Georgetown Lake rainbow strain evaluation winter 1985-86.

Strain	Stocking date		Size	Number	%	Sample No.	% Catch	Mean length	Range
Arlee	6/84	6/85	5"	257000	47	169	70	12.6"	7.7"-16.8"
Eagle Lake	9/84	7/85	5"	184000	33	70	29	13.6"	8.3"-16.4"
Kamloops	8/84	8/85	3-4"	111000	20	3	1	11.1"	9.3"-14.8"
Total				552000	100	242	100	12.8"	7.7"-16.8"

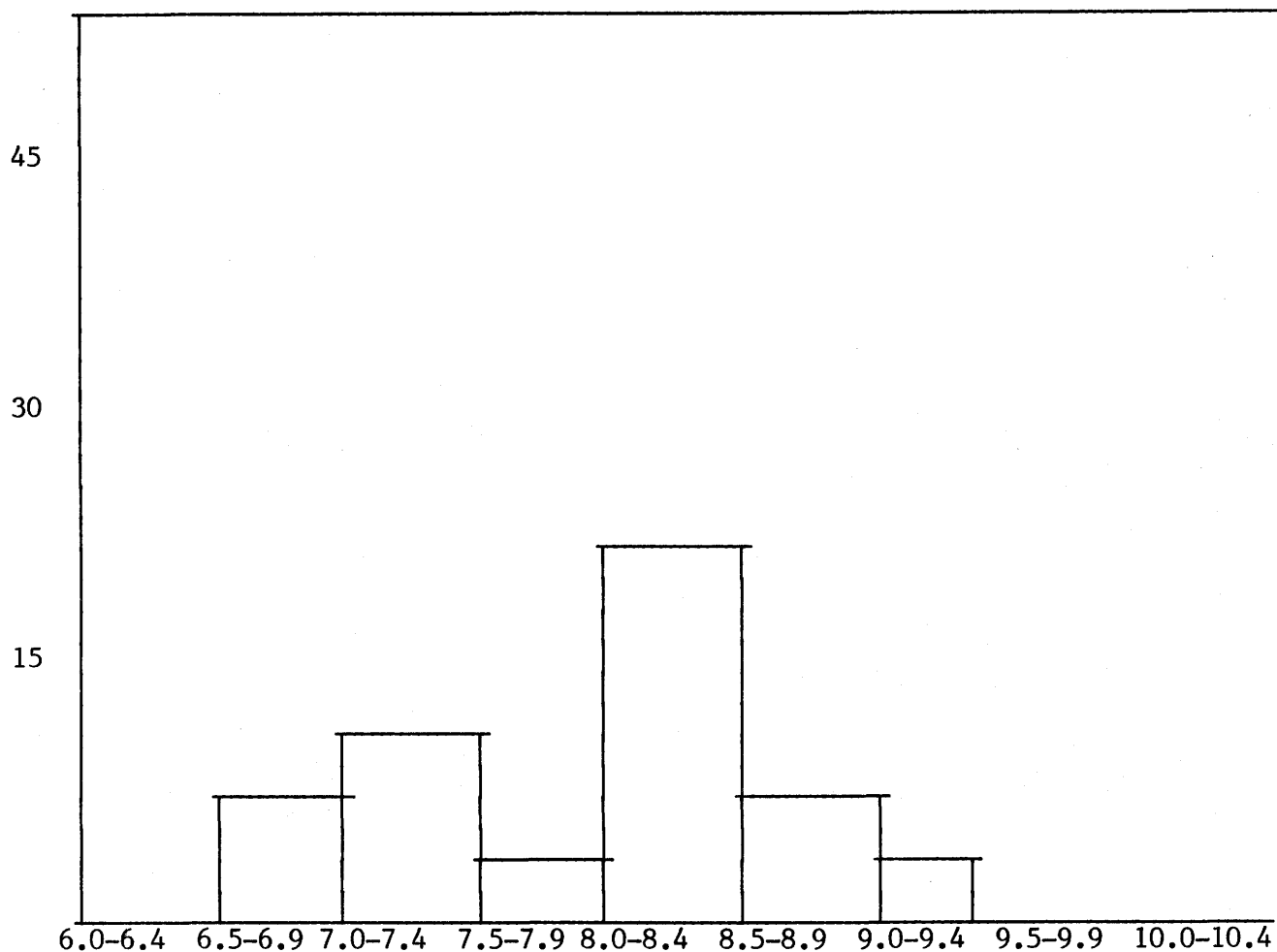


Figure 1. Georgetown Lake Kokanee angler creel sample, N=48, January 24, 1984

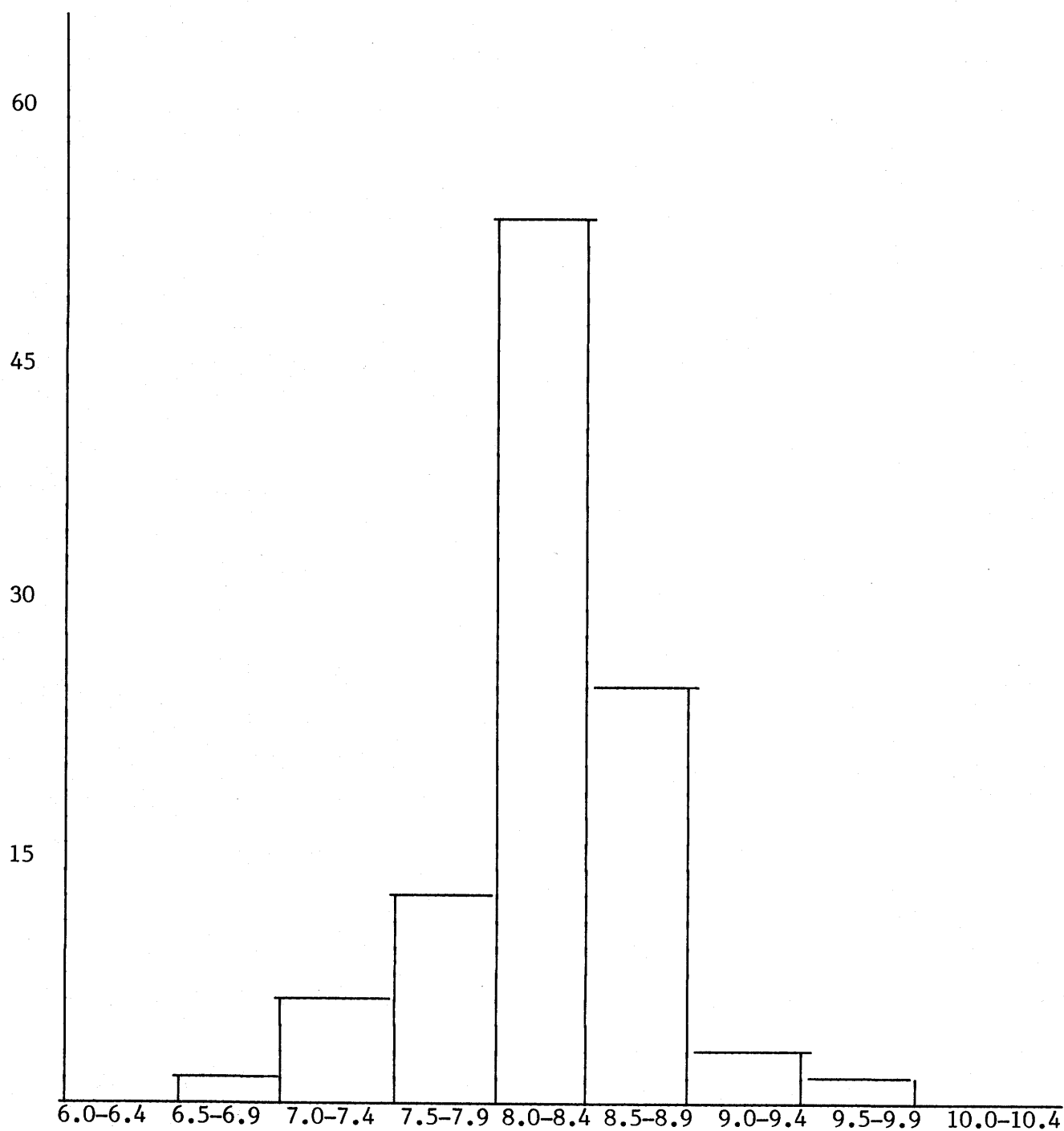


Figure 2. Georgetown Lake Kokanee angler creel sample, N=96, January 14 & 17, 1985

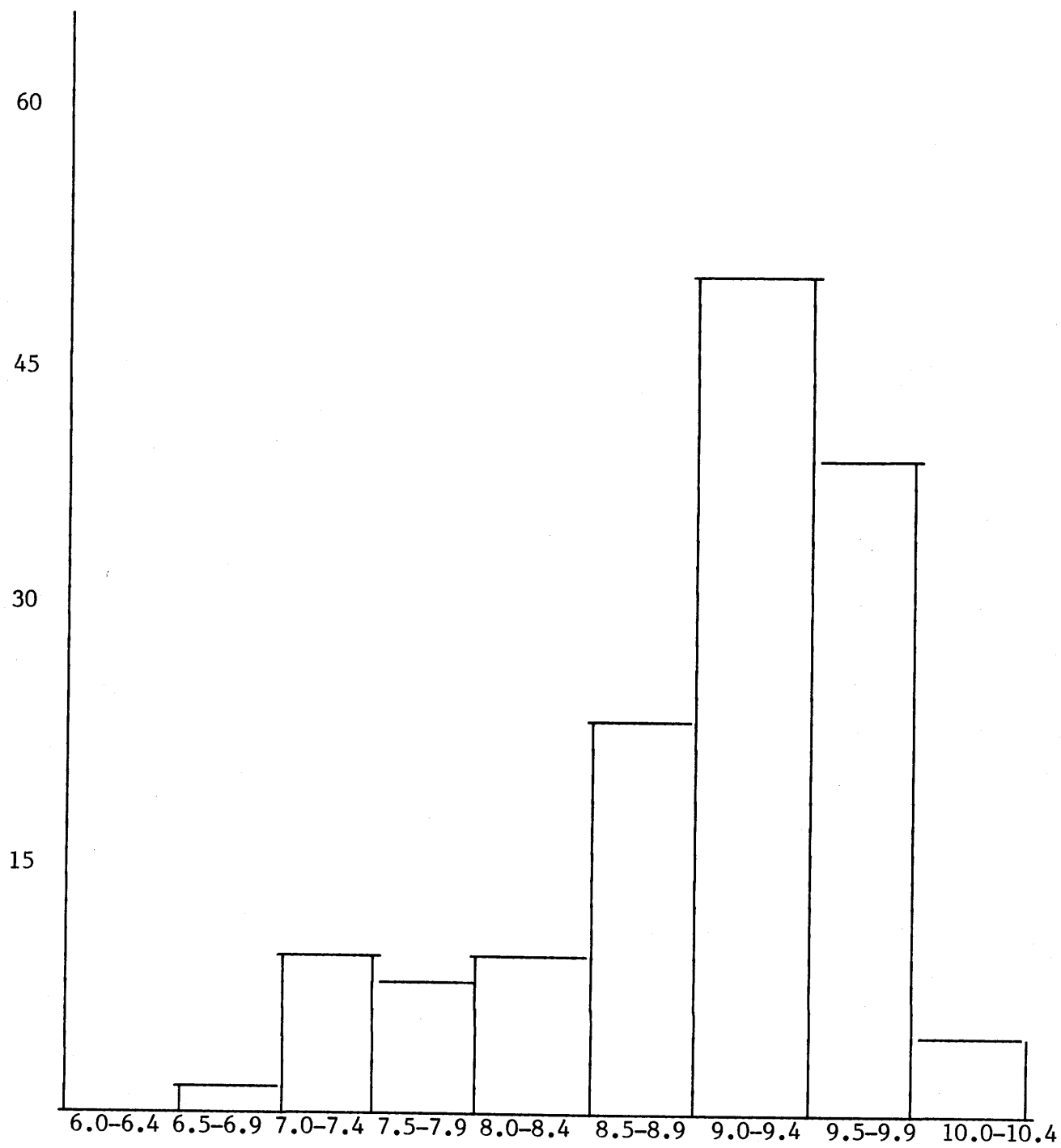


Figure 3. Georgetown Lake Kokanee angler creel sample, N=133, January 19, 1986

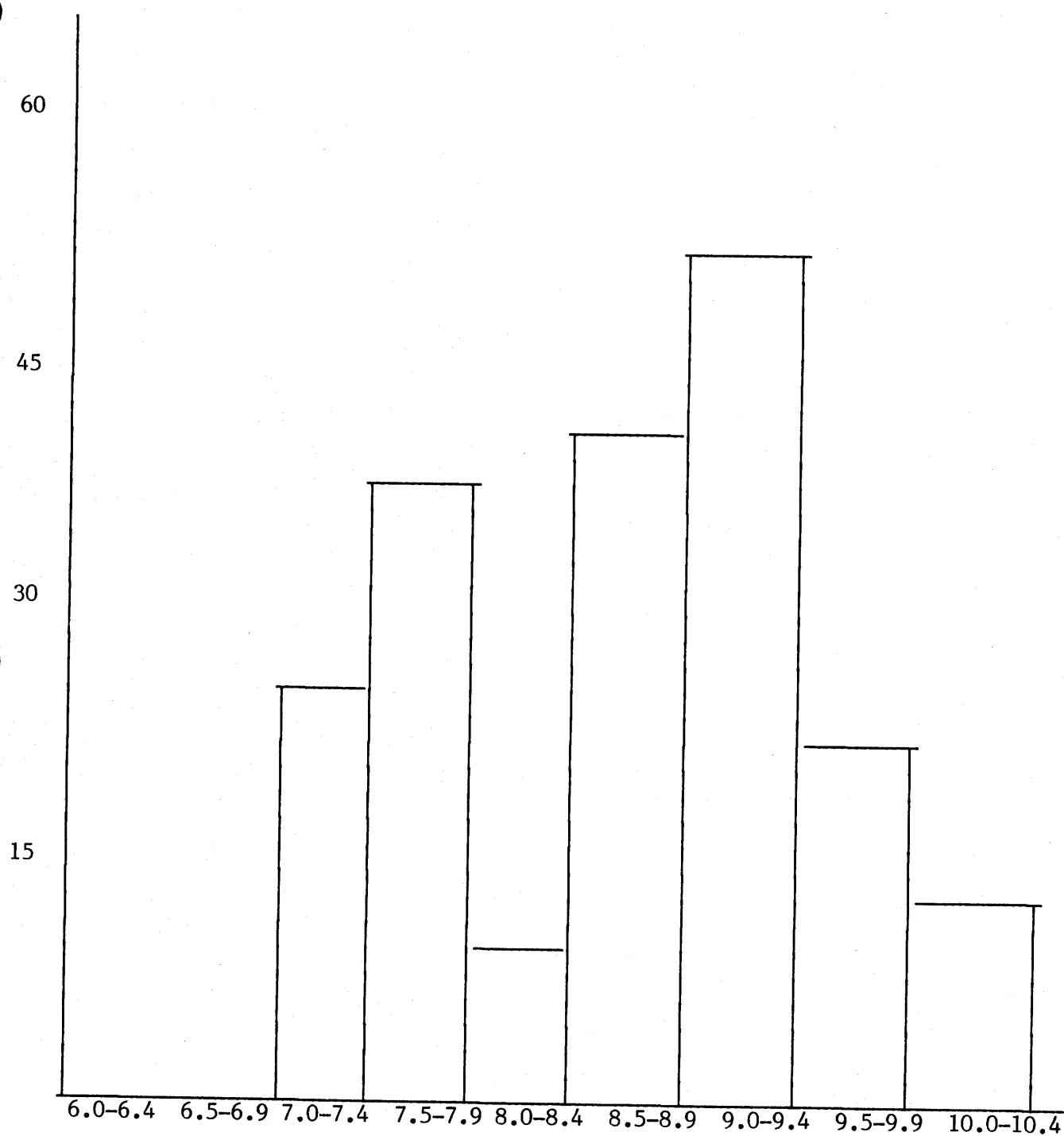


Figure 4. Georgetown Lake Kokanee angler creel sample, N=187, January 21-24, 1987

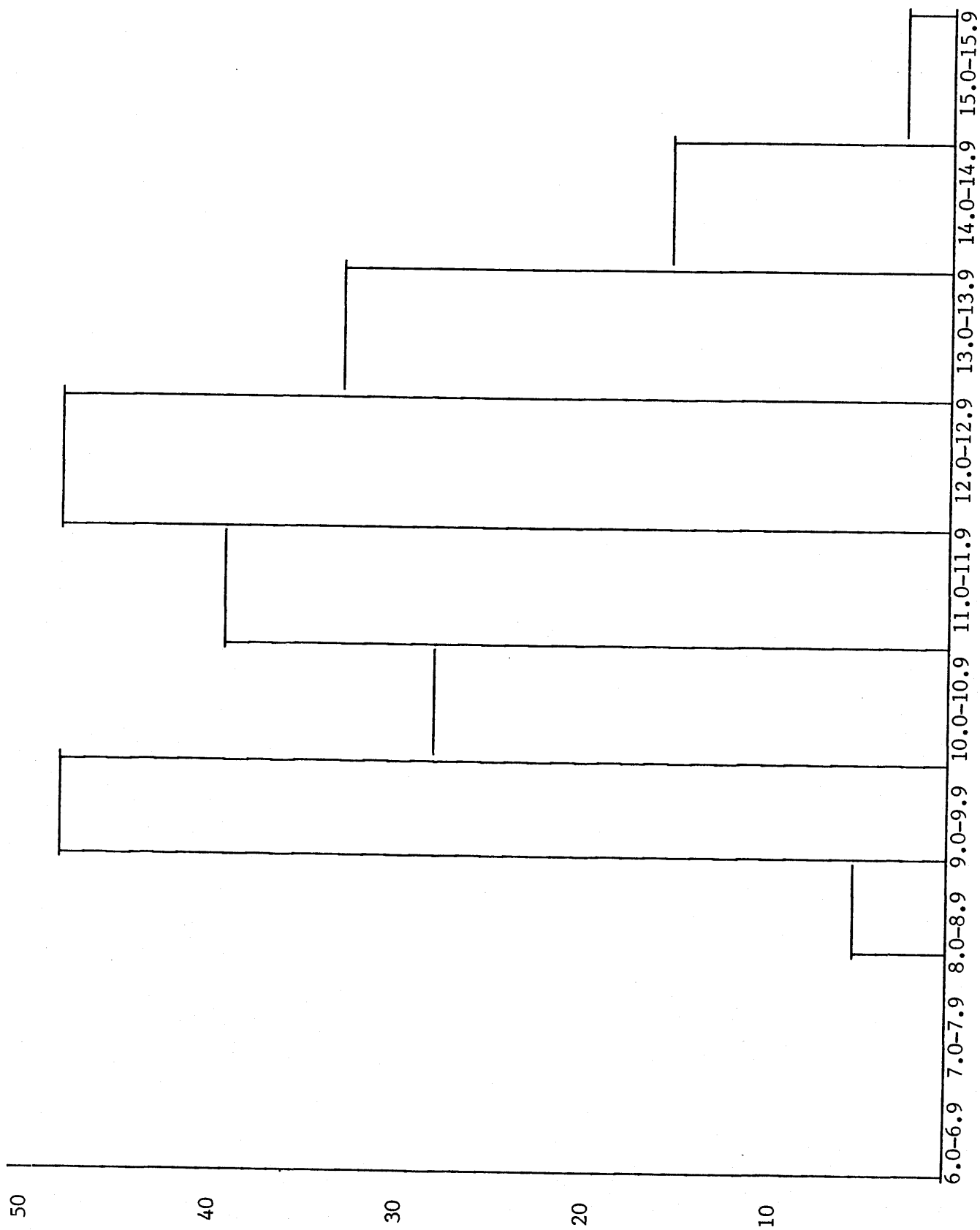


Figure 5. Length frequency Arlee rainbow - Georgetown, winter 1985-86, N=210

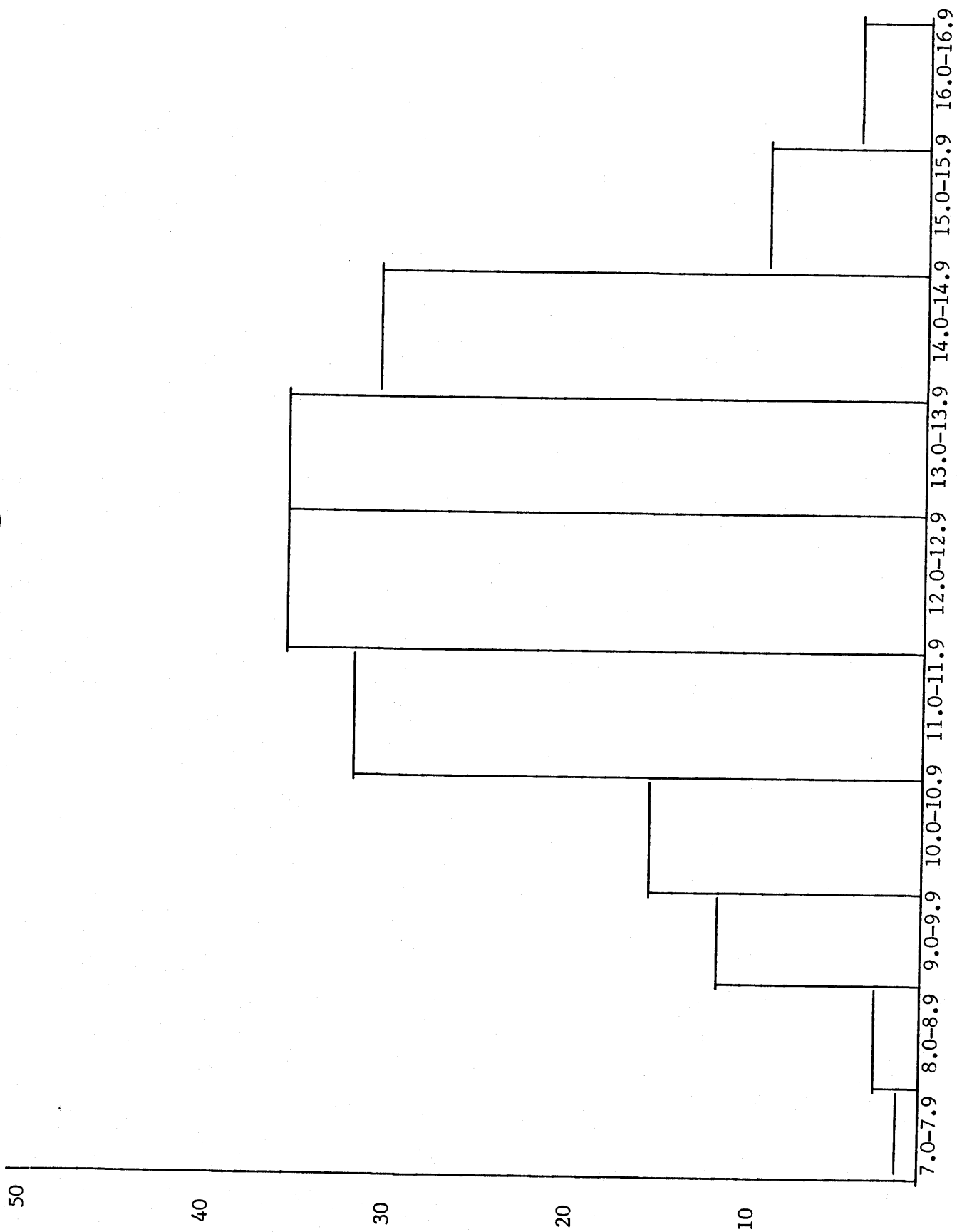


Figure 6. Length frequency Arlee rainbow - Georgetown, winter 1986-87, N=169

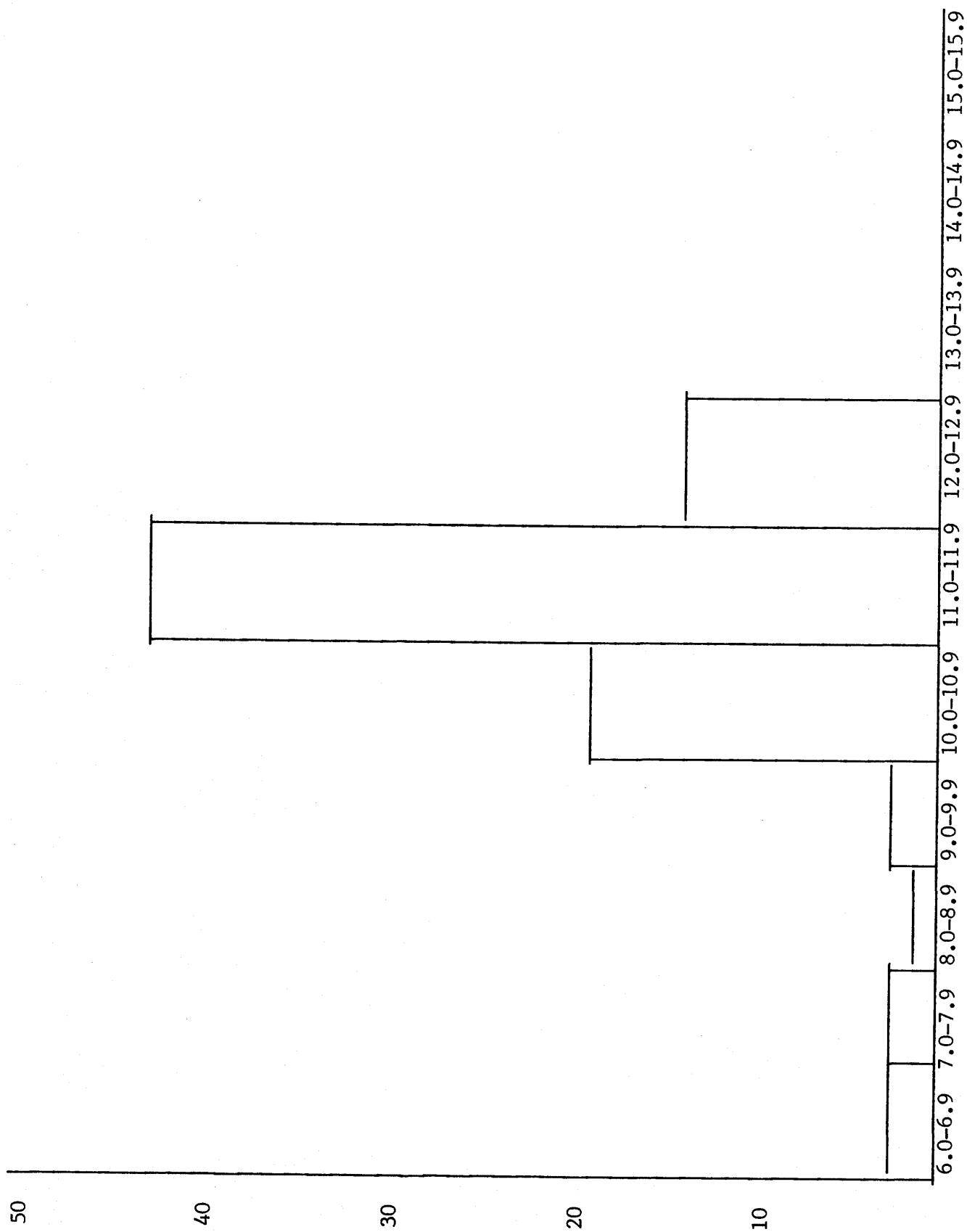


Figure 7. Length frequency Eagle Lake rainbow, angler creel, Georgetown, winter 1985-86, N=84

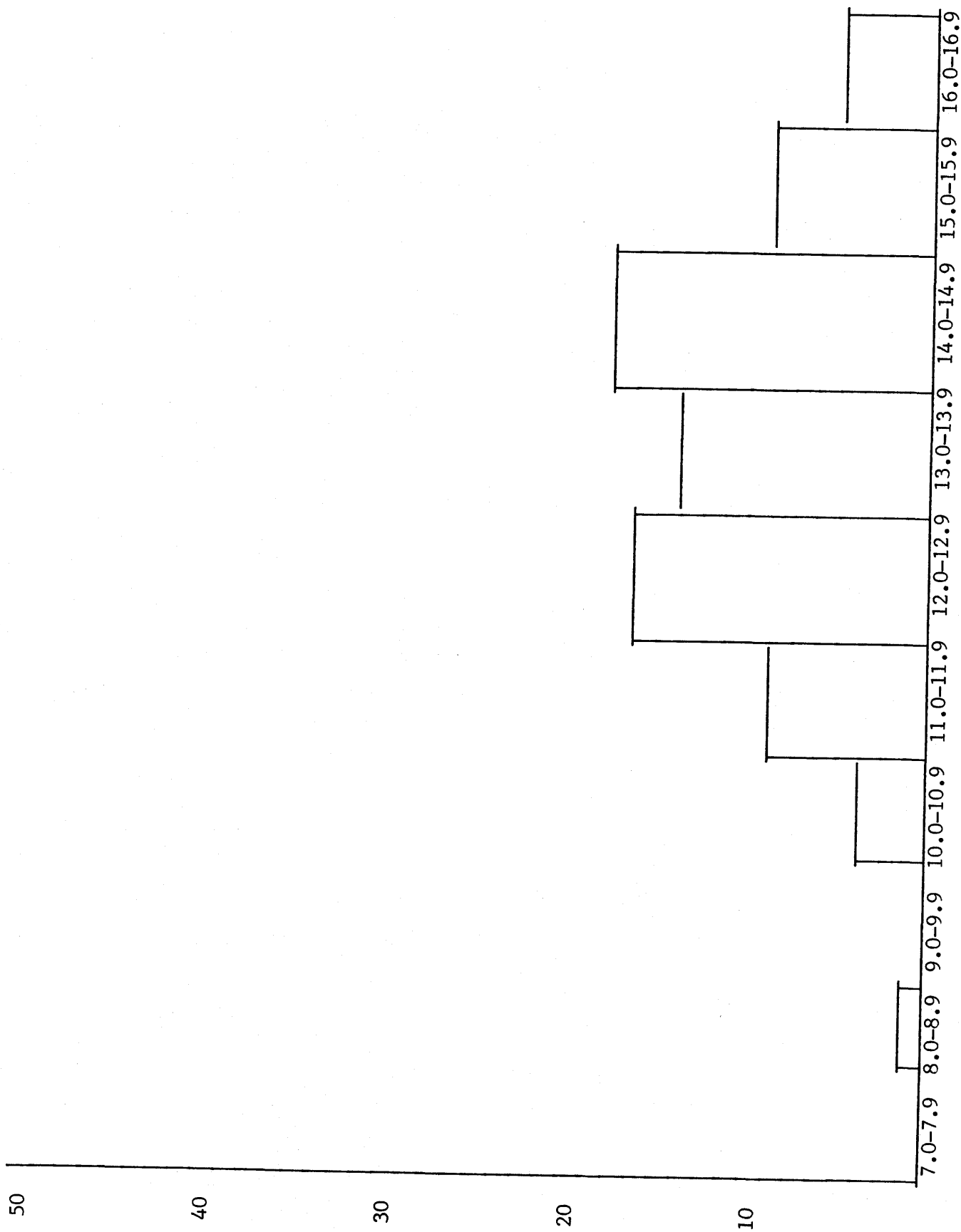


Figure 8. Length frequency Eagle Lake rainbow - Georgetown, winter 1986-87, N=70

2. To determine the acceptability of new Georgetown Lake fishing regulations with the public and propose a change to the commission if acceptable.

Effective in license year 1985-86 new regulations were imposed at Georgetown Lake. Impetus for the regulatory changes came from requests by sportsmen for better quality fishing and from fisheries data indicating a long term decline in fish size. Trout limits were reduced from 10 rainbows and 20 brook trout to 5 trout of any species. Season duration was lengthened by the elimination of the early winter closure and extension of the ice fishery through March 31. This resulted in an expansion of fishing opportunity from 240 to 314 days per year. Two new strains of rainbow were added to the stocking with the hope that they would achieve larger sizes and become predators on the overabundance of kokanee. Evaluation of the success of the new management effort was begun in January of 1986.

Angler perceptions of the results of these regulation changes were overwhelmingly positive in 1986 & 1987. Most recognized the increase in rainbow sizes and were supportive of the improved angling quality.

3. To measure dissolved oxygen concentrations during the period of ice cover on Georgetown Lake.

Dissolved oxygen concentrations in Georgetown Lake were monitored monthly during the period of safe ice cover. Oxygen concentrations observed were within the normal range for Georgetown, no significant winterkill was anticipated and none occurred.

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Date: July 1987